History and over view of the California prune industry

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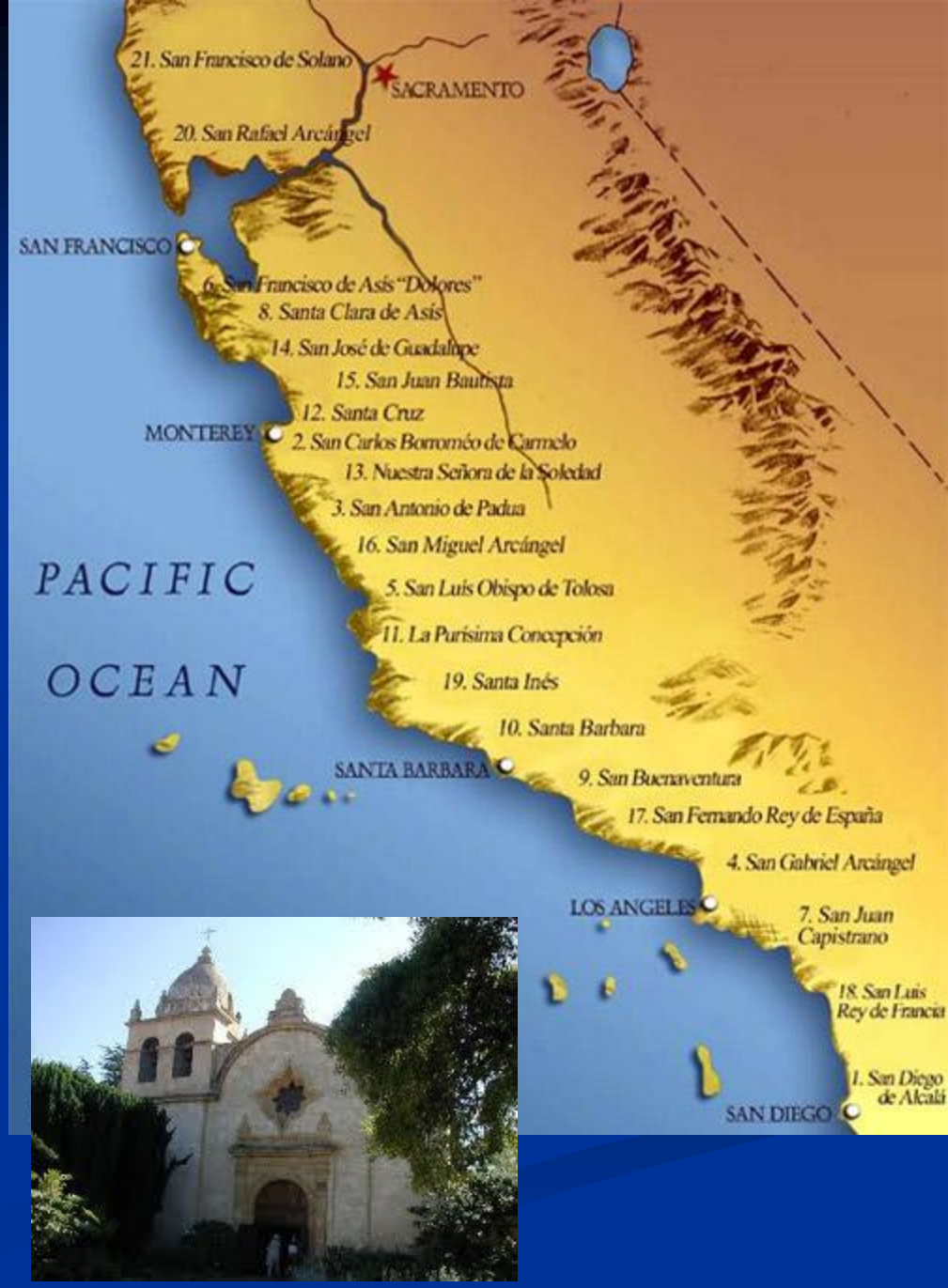
History

- European plum, *Prunus domestica*, was brought into California by Franciscan Padres who founded a chain of 21 missions between 1769 and 1823 at the direction of King Charles III of Spain

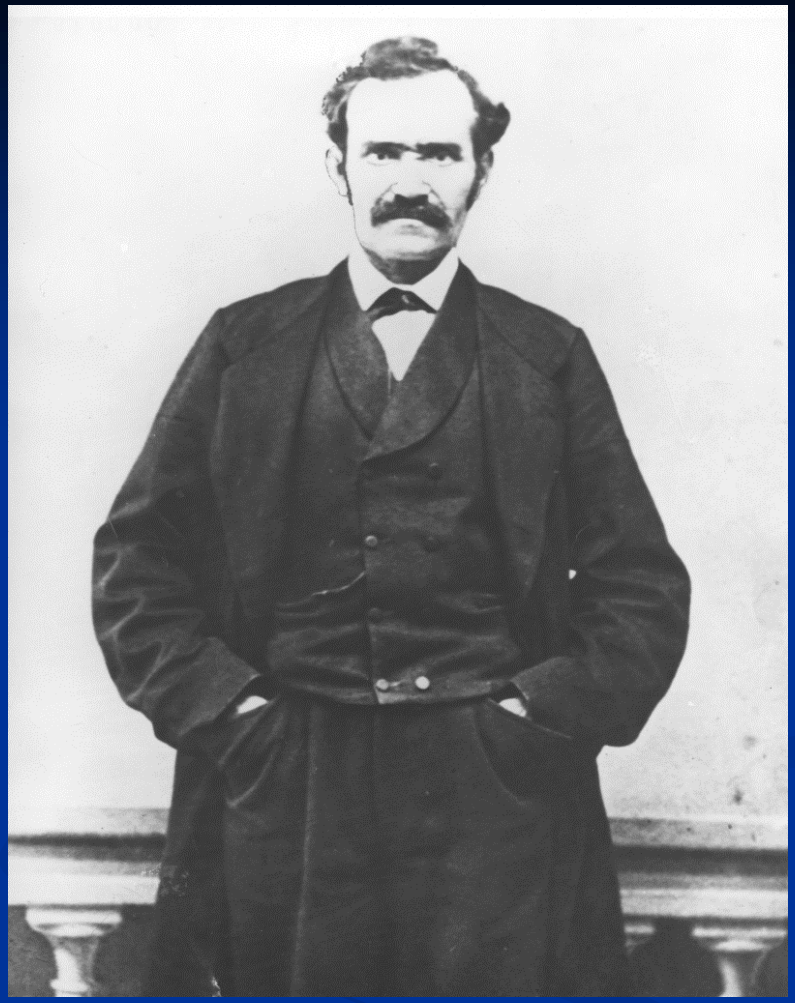
- After Mexican independence the missions were secularized and sold in the 1830s, falling into disrepair…most horticultural crops were lost

- All 21 missions were restored to the Catholic Church in 1863 by President Abraham Lincoln



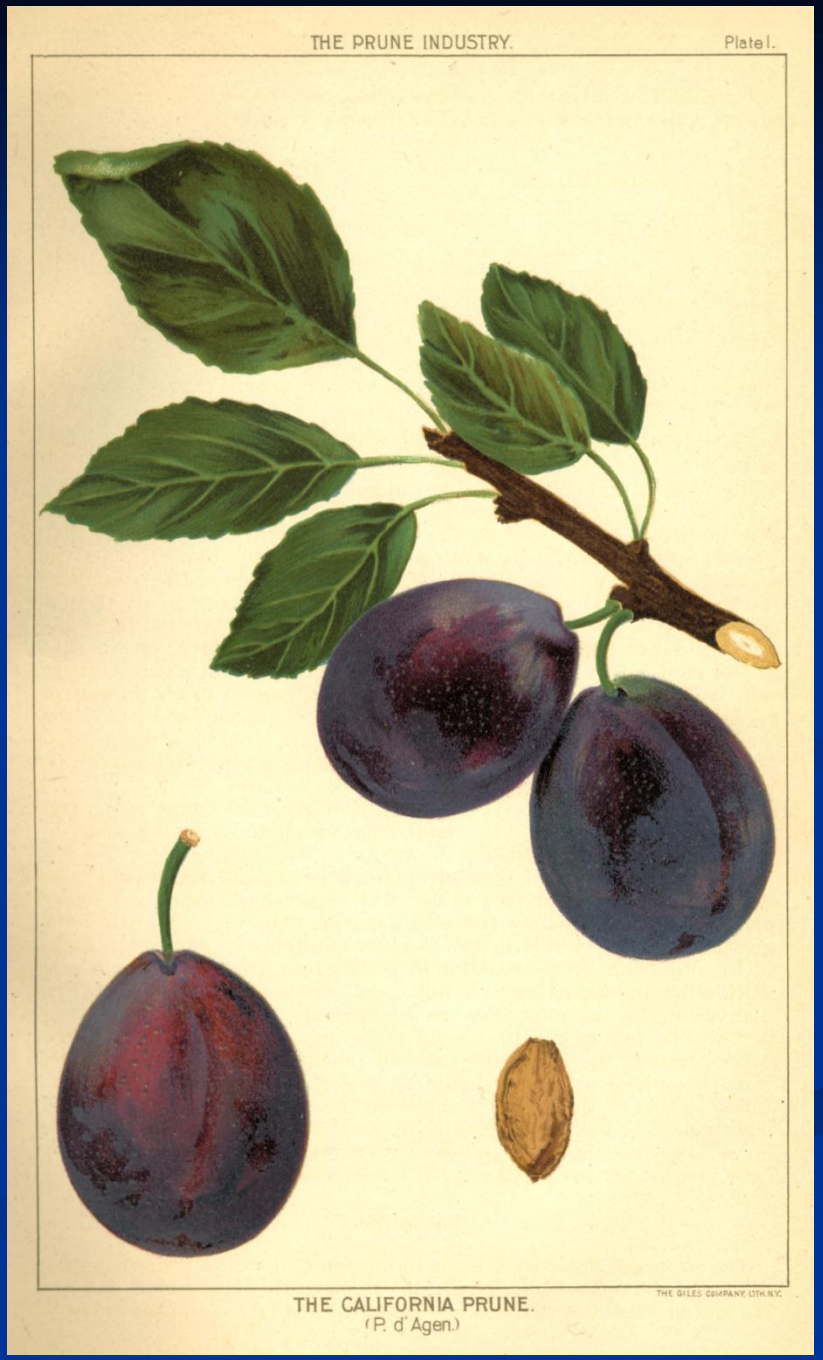
Beginning of the California prune industry

- Louis Pellier, a French horticulturist came to California seeking gold
- In 1850, after failing in the mines he established Pellier's City Gardens nursery in San Jose in the Santa Clara Valley
- His brother Pierre joined the nursery operation in 1853 then returned to France in 1856 to marry



Beginning of the California prune industry

- Pierre came back to San Jose in December 1856 with his bride and a large collection of nursery stock including fruit scions and cuttings
- Louis Pellier introduced the sweet French plum, the ‘Prune d’ Agen’ in winter 1856-57
- This introduction sparked the beginning of the California prune industry revolutionizing the Santa Clara Valley



First California prune production

- Louis Pellier provided ‘Prune d’ Agen’ or ‘French’ scions to John Ballou and George Tarleton who top-grafted on native and Damson plum rootstocks
- John Ballou shipped 130 pounds (59 kg) of dried prunes to San Francisco in 1859, first record of commercial prune production
- In 1868, Ballou sent 11 tons (10,000 Kg) of dried prunes to eastern US markets by ship
- Completion of the transcontinental railroad in 1869 opened Eastern markets for regular shipments of California prunes

California from Afar --- courtesy Dr. William Bowen, CSU Northridge

Establishment years of the California prune industry

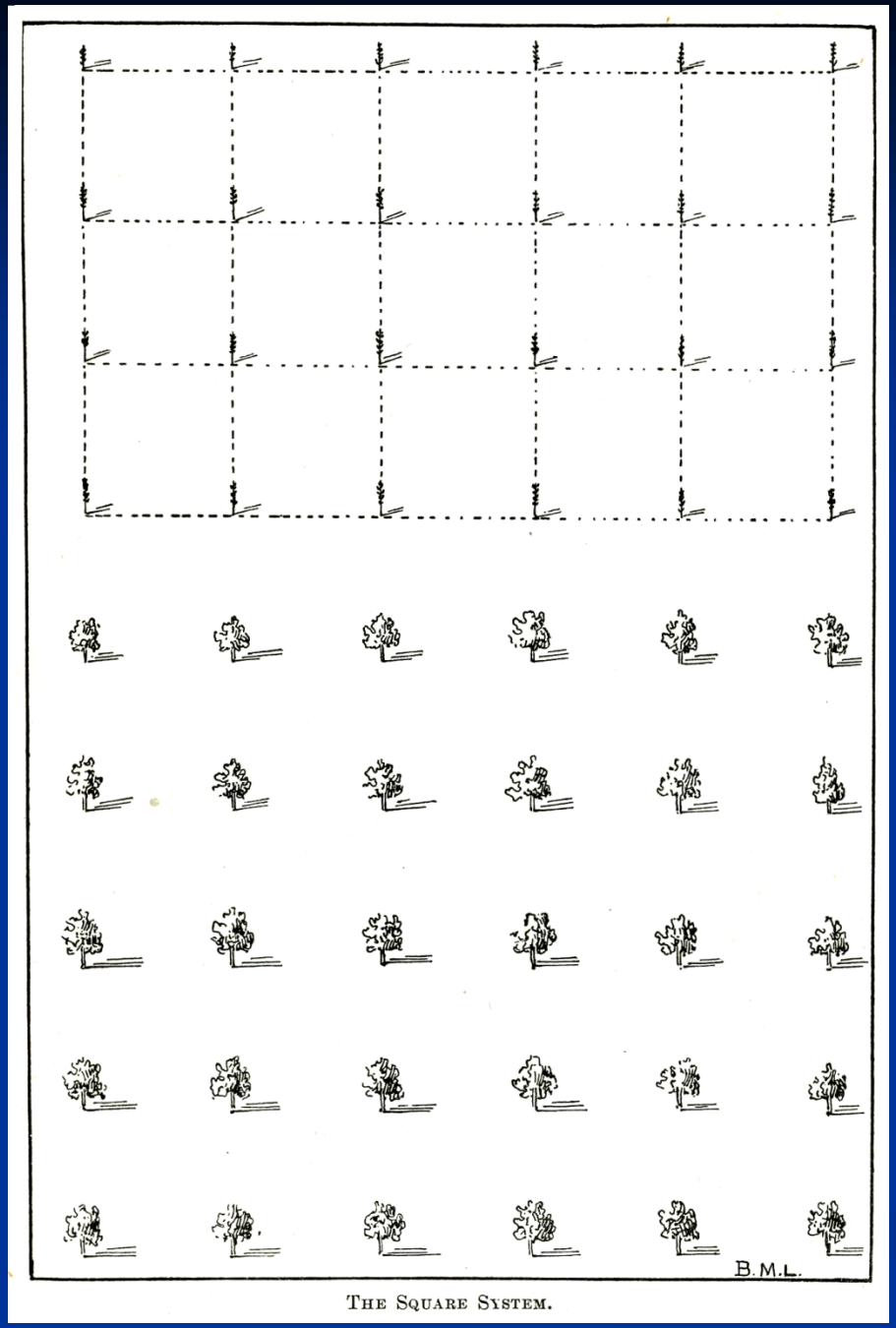
- By 1870, California had over 19,000 prune trees (~ 190 acres or 77 hectares)
  - Bradley orchard success in San Jose led others to go into prune growing and the industry grew rapidly
- Prune growing then began on a larger scale in and near Saratoga
  - 1878, O'Banion and Kent orchard
  - 1880, Dr. Handy orchard, planted 100 ac
  - 1881, Buxton orchard planted

Establishment years of the California prune industry

- In 1886, California shipped 2 million lbs. of dried prunes
- By 1891, prune shipments reached 27 million lbs. (with over 21 million pounds shipped from San Jose alone)

The following table gives the foreign import and California production for the six years from 1885 to 1891, inclusive:

Year.	Foreign Imports, by Years, Ending June 30.		California production, by Years, ending December 31—
	Pounds.	Value.	Pounds.
1885	57,631,820	$2,147,505 00	----------
1886	64,995,545	2,026,595 00	2,000,000
1887	92,032,625	2,999,648 00	1,825,000
1888	70,626,027	2,197,150 00	2,100,000
1889	46,154,825	1,423,304 00	15,200,000
1890	58,093,410	1,789,176 00	12,200,000
1891	34,281,322	2,054,486 00	27,000,000



THE SQUARE SYSTEM.

California State Board of Horticulture Annual Report,1891

- Outlined several planting arrangements for orchard design
- Concluded a square arrangement was the “most approved” method with trees planted 20 feet (6.1 m) apart

Rootstock

- With soil limitations rootstocks were chosen to improve tree survival
- Diseases included bacterial canker & *Phytophthora spp.*
- As early as 1891

Myrobalan plum (*P. cerasifera*) was recommended for California prune orchards

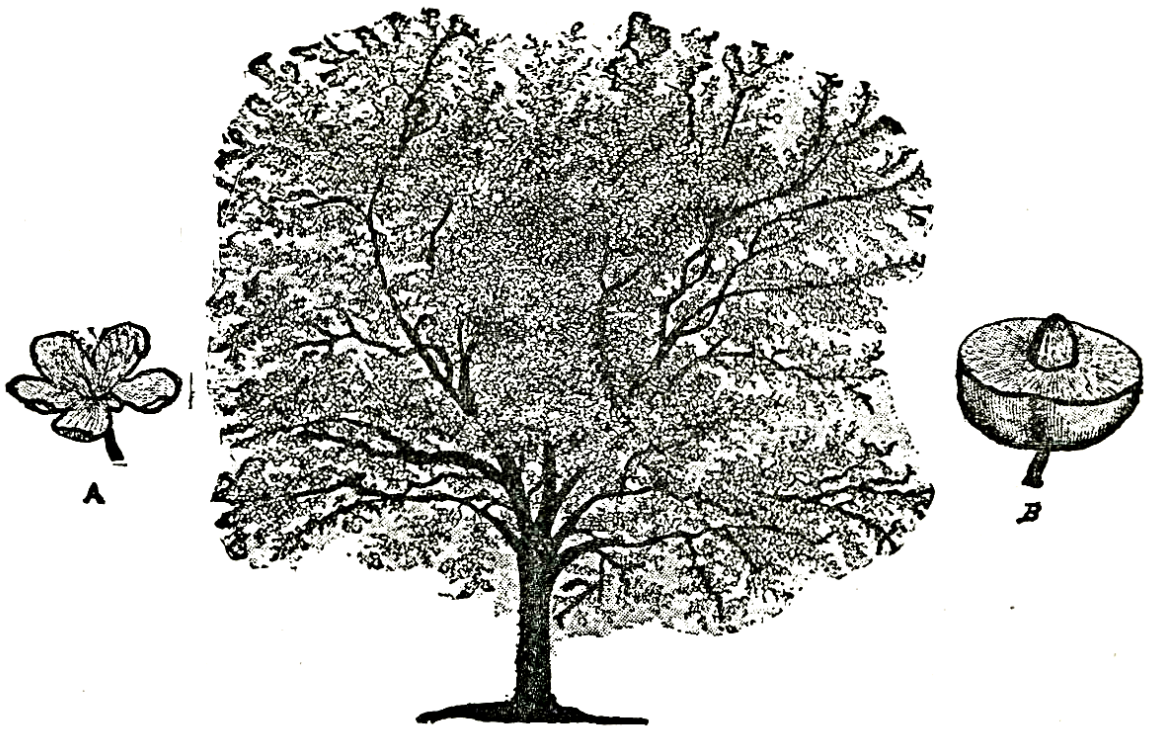
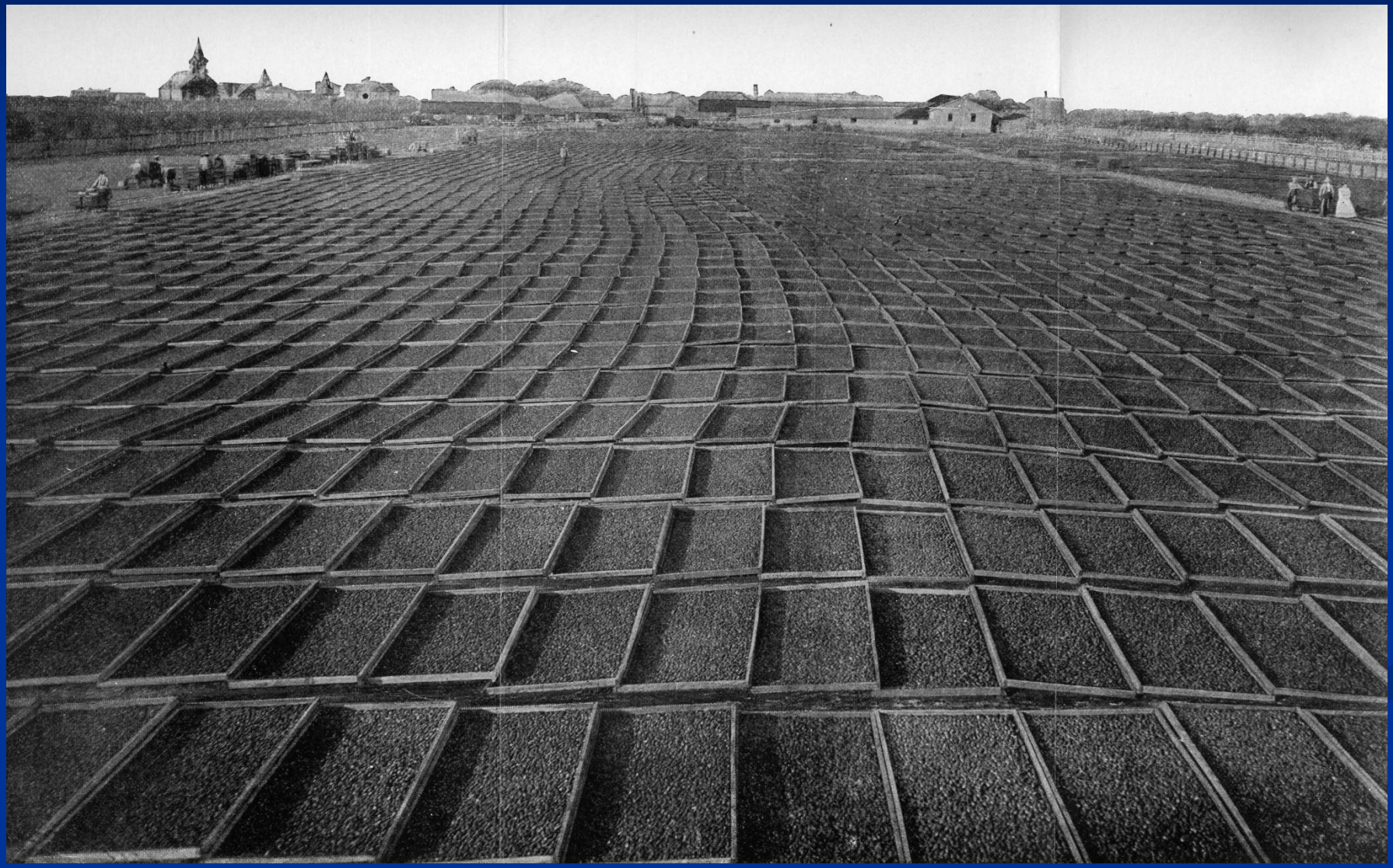


Fig. 13.

Myrobalan plum tree. *A*. The flower. *B*. The fruit.

California prune industry, 1891

- Sun drying required 1 acre of trays for every 20 acres of orchard
- Photo - prune drying grounds with 10,000 trays in Santa Clara

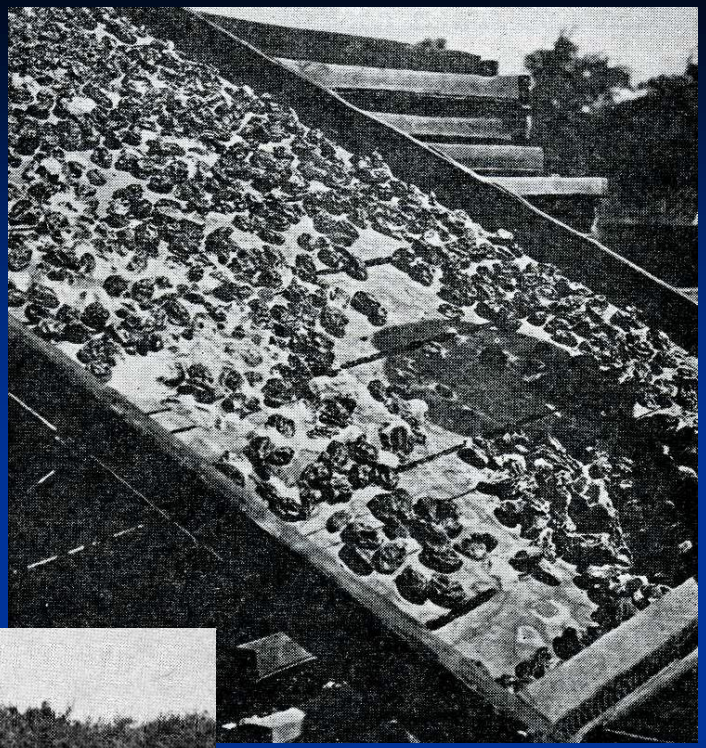


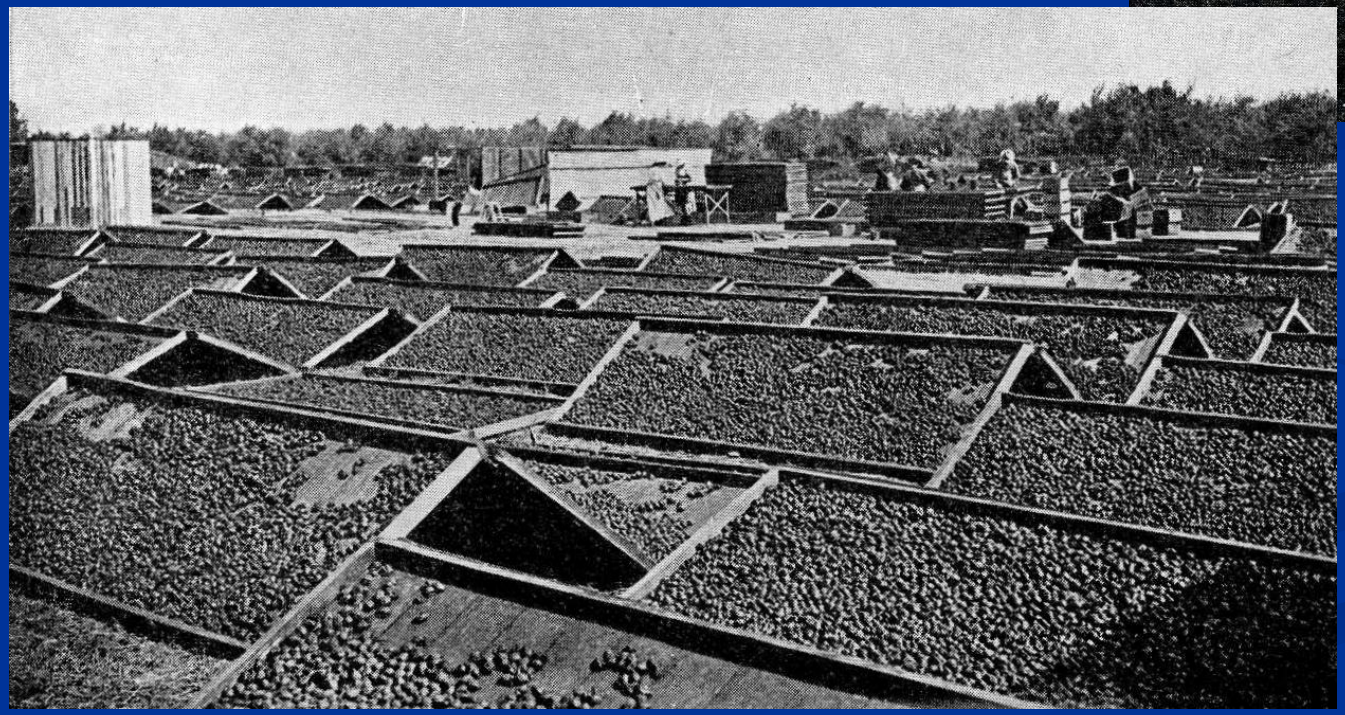
California prune industry, 1891

- Prune orchard in full bearing with the required drying-grounds

September 1918, disaster - Rain!

- Two weeks of daily rain, followed by unfavorable drying weather for three weeks
- Mold and yeast fermentation
- At least 50% of the crop was a complete loss

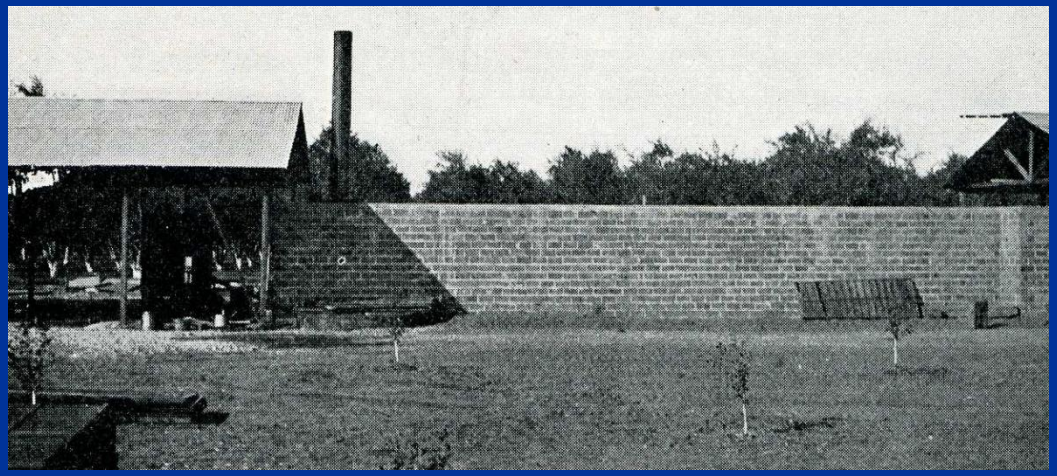




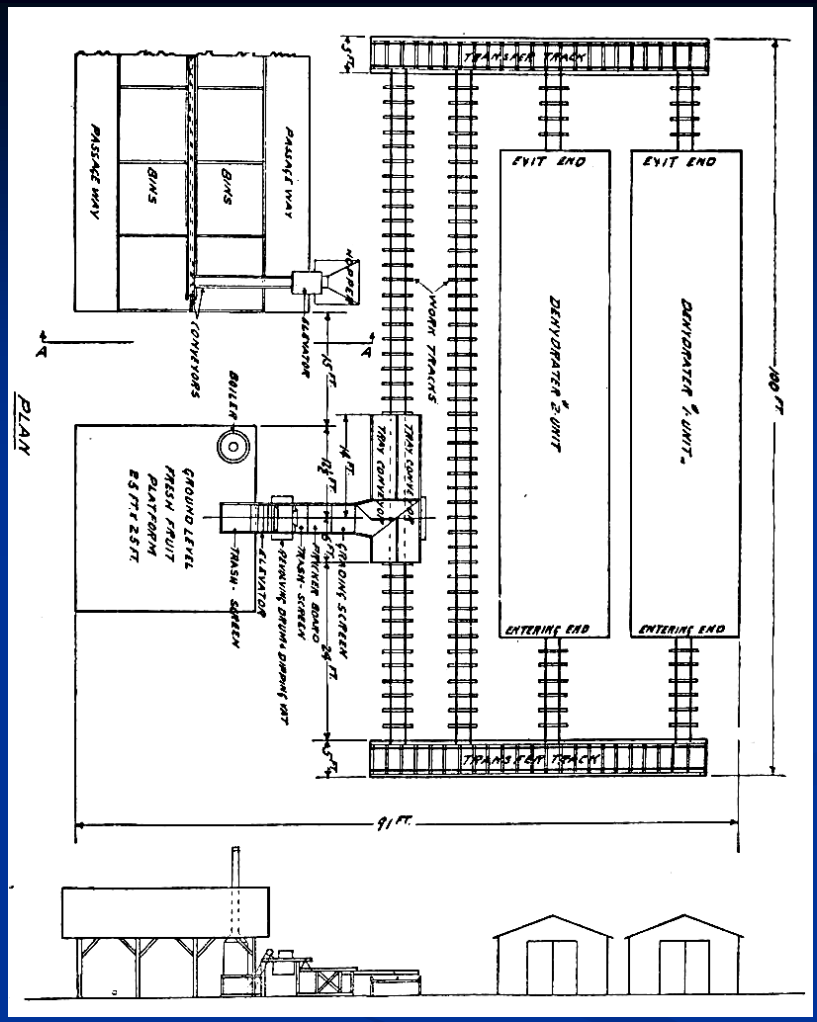
20 September, 1918
Penicillium, *Mucor*, & *Alternaria* fungi

Advent of tunnel dehydrating

- After 1918, several manufacturers developed dehydrators
- By 1921, 49 prune dehydrators were reported to be operating
- 400 dehydrator plants were operating by 1928 drying nearly 20% of the crop



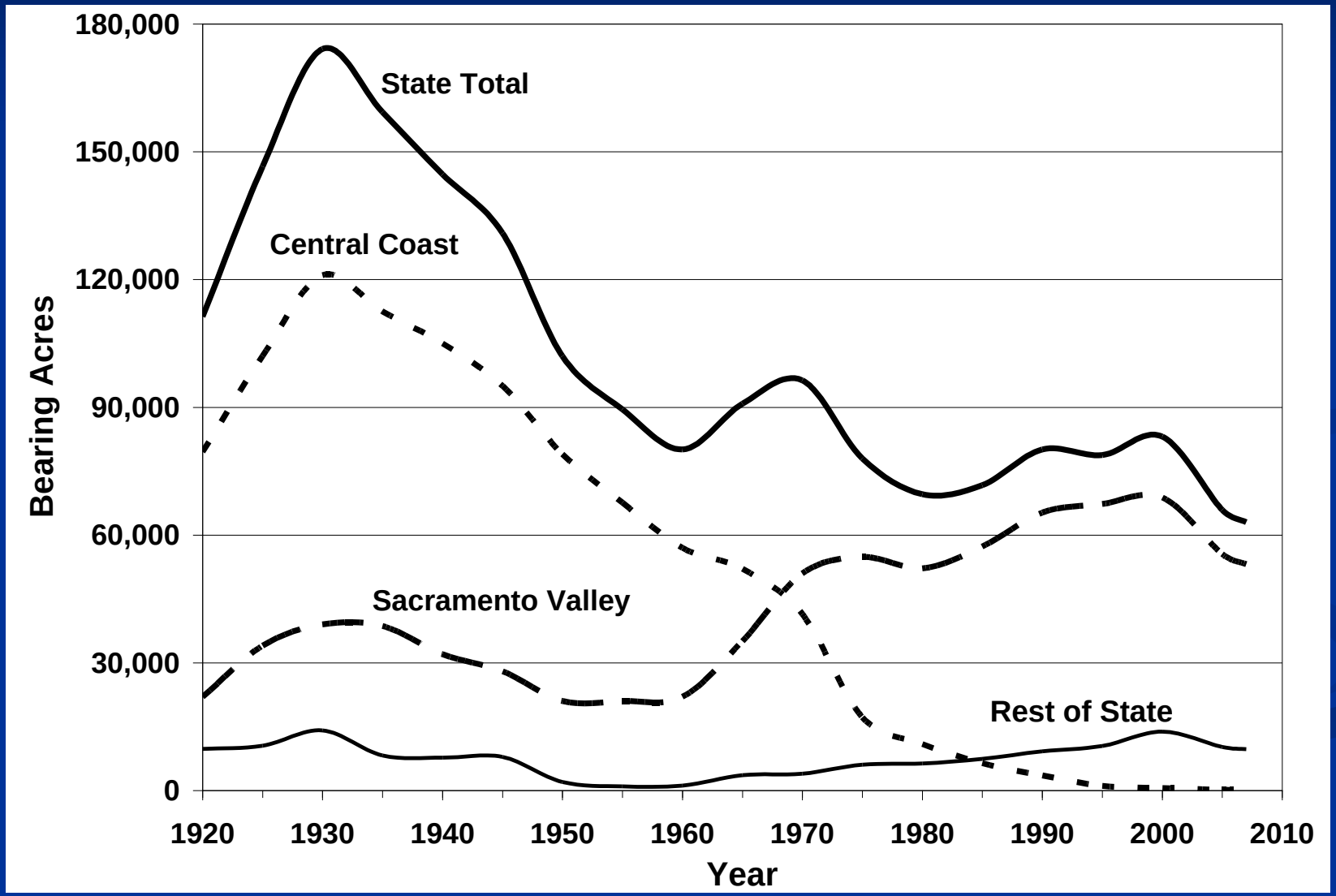
1921 - one of the first air-blast tunnel dehydrators (note young prune trees planted in the former dry yard)



A.W. Christie, UC AES Bulletin 404, August, 1926, Provided suggested dehydrator designs

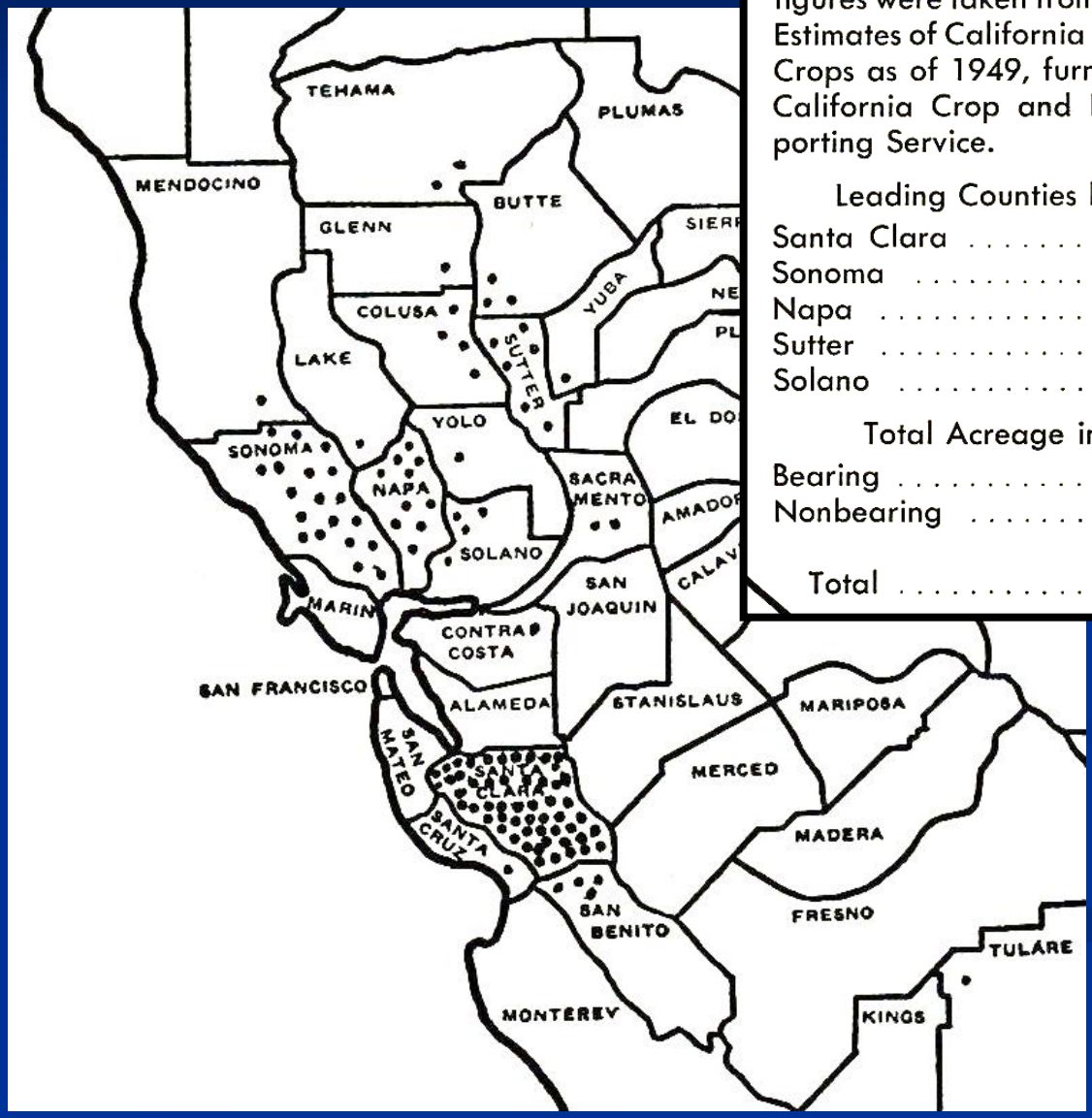
Rapid growth in coastal areas until about 1930

- California acreage peaked in 1926 at 193,511 total acres (78,311 hectares)



1949 Distribution of California prune acreage

- Acreage declined statewide
- Coastal districts were still dominant
- Sacramento valley industry expansion had not yet begun



Each dot represents 1000 acres. The figures were taken from the Acreage Estimates of California Fruit and Nut Crops as of 1949, furnished by the California Crop and Livestock Reporting Service.

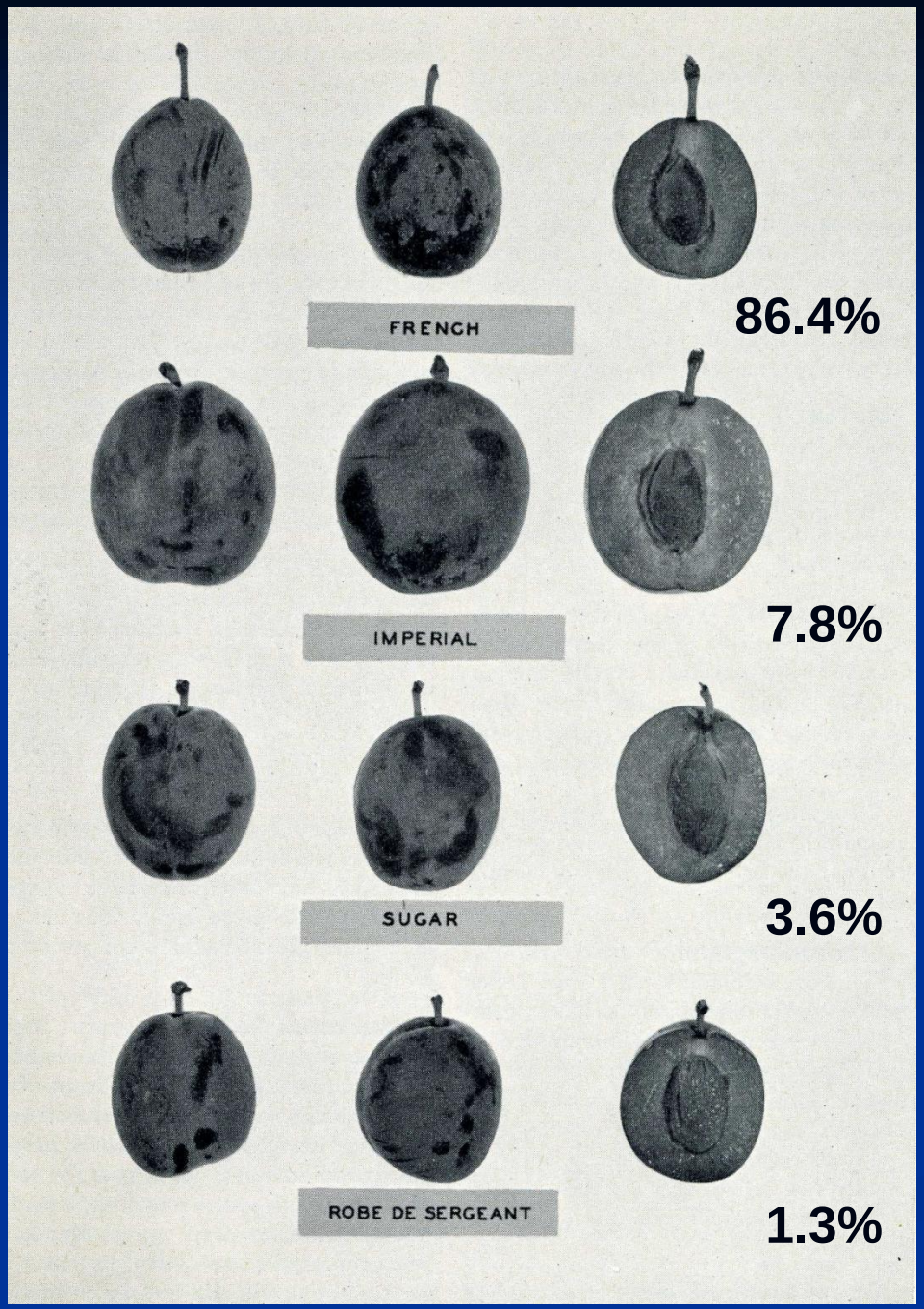
Leading Counties by Acres

Santa Clara	53,836
Sonoma	19,149
Napa	9,589
Sutter	5,721
Solano	4,290

Total Acreage in State

Bearing	110,887
Nonbearing	6,857
Total	117,744

California from Afar --- courtesy Dr. William Bowen, CSU Northridge

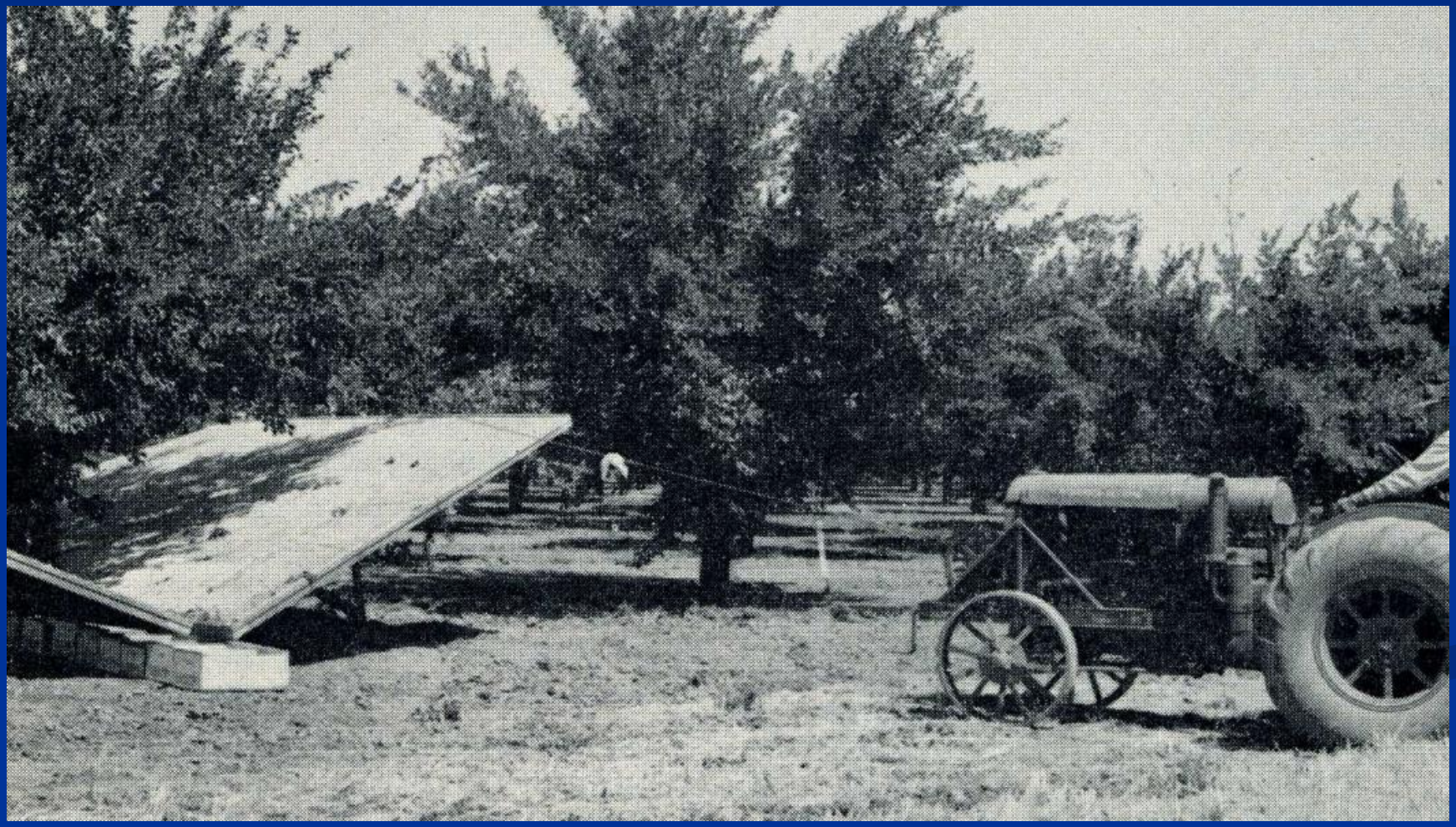


Four leading prune cultivars,1949

- 'French' was by far the most popular cultivar in California
- The others included 'Imperial', 'Sugar', and 'Robe de Sergeant'

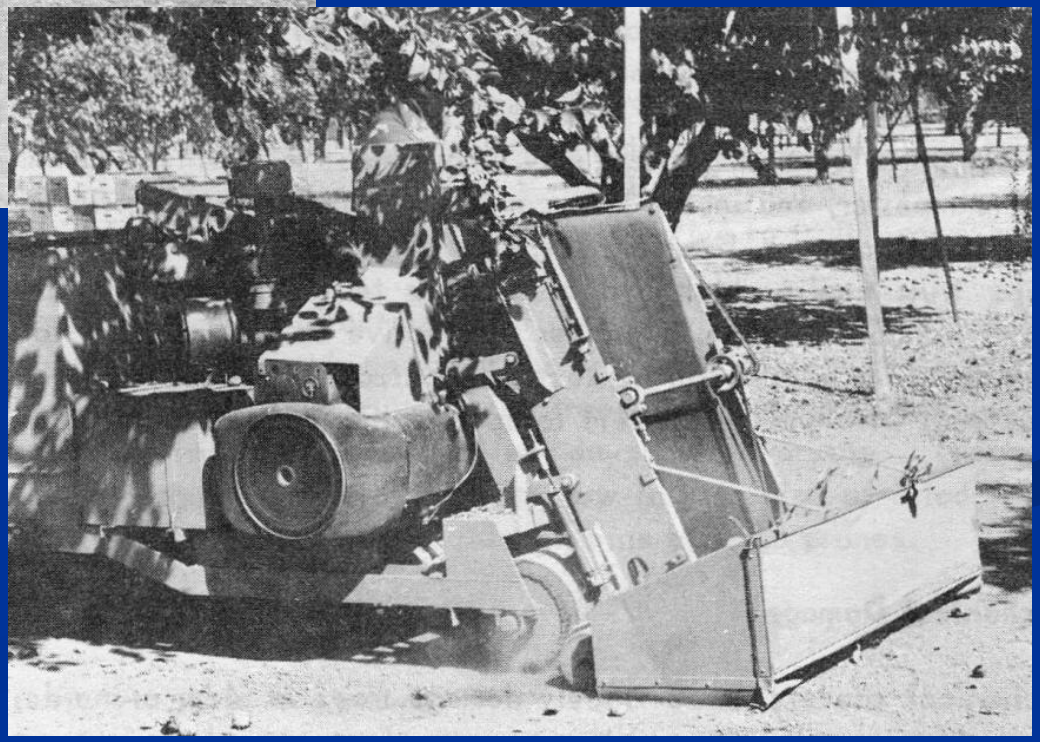
Early mechanical harvest in the Sacramento Valley

- Circa 1950, tractor mounted cable shaker with hand moved catching frame that loaded fruit field boxes



Mechanical prune harvest, circa 1964

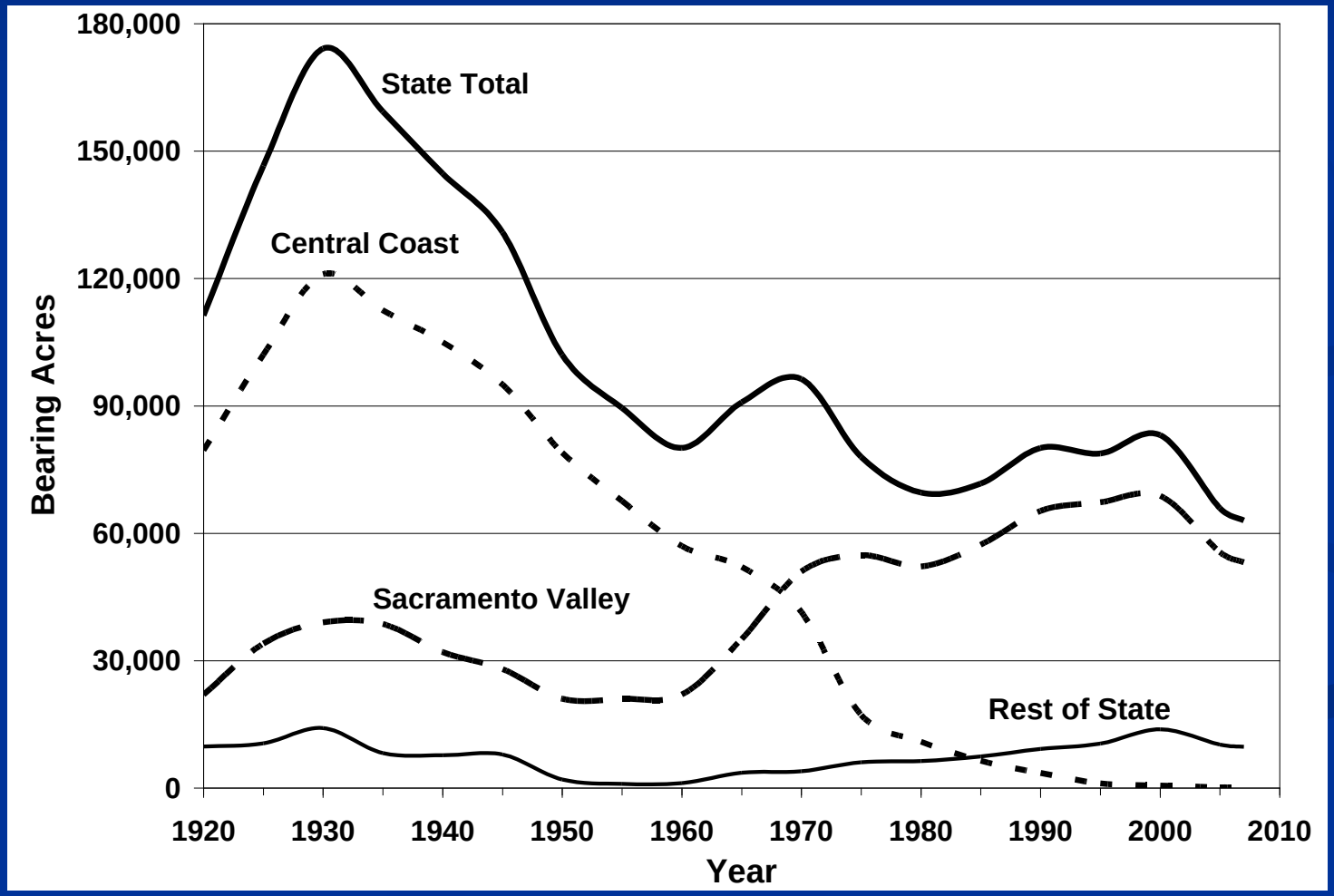
- Tractor mounted boom shaker with catching frame and conveyer loading fruit bins



- In coastal areas, fruit dropped to the ground & was harvested by pickup machine

During and following the 1960s…

- Coastal acreage virtually disappeared
- Prune industry moved into the Sacramento Valley
- Some acreage in the San Joaquin Valley



California from Afar --- courtesy Dr. William Bowen, CSU Northridge

Today…

‘Improved French’

- Cultivar constitutes 95% of prunes grown in California
- Preferred because
  - Uniform maturity
  - High sugar
  - Heat tolerance
- California produced approximately 43% of the world’s prunes in 2011

More rootstock choices

- Plum rootstocks
  - Marianna 2624
  - Myrobalan seedling
  - Myrobalan 29C
  - Marianna 40 (M40)
- Peach rootstocks
  - Lovell

Irrigation

- ~ 40 acre-inch a year
- Deficit irrigation
  - Lower water through out the season
  - Can help manage harvest timing
  - Can maintain fruit quality when done thoughtfully

- Irrigation-related problems
  - Small prune size
  - Fruit splitting, end cracking
  - Decreased tree health

Tree nutrition

- Nitrogen
- Potassium
- Zinc

Insect pest management

- Monitor with sampling & pheromone traps
- Degree day phenology models provide life cycle understanding & guide improved spray timing using selective spray materials

Peach Twig Borer

Anarsia lineatella

Monitor San Jose scale & parasitoid activity

Diaspidiotus perniciosus

Aphids, Leaf curl & Mealy Plum

Brachycaudus helichrysi & Hyalopterus pruni

Disease management

- Essential when rains come during and after bloom

Russet or lacey scab, physiological disorder

Brown rot blossom blight
Monilinia fructicola

Prune rust
Tranzschelia discolor

Plant protection practices

- Cultural practices
- Pest, disease & weed monitoring
- Application of selective chemical controls only when necessary
- Awareness of resistance management
- Recommendations can be found at www.ipm.ucdavis.edu

Harvesting prunes

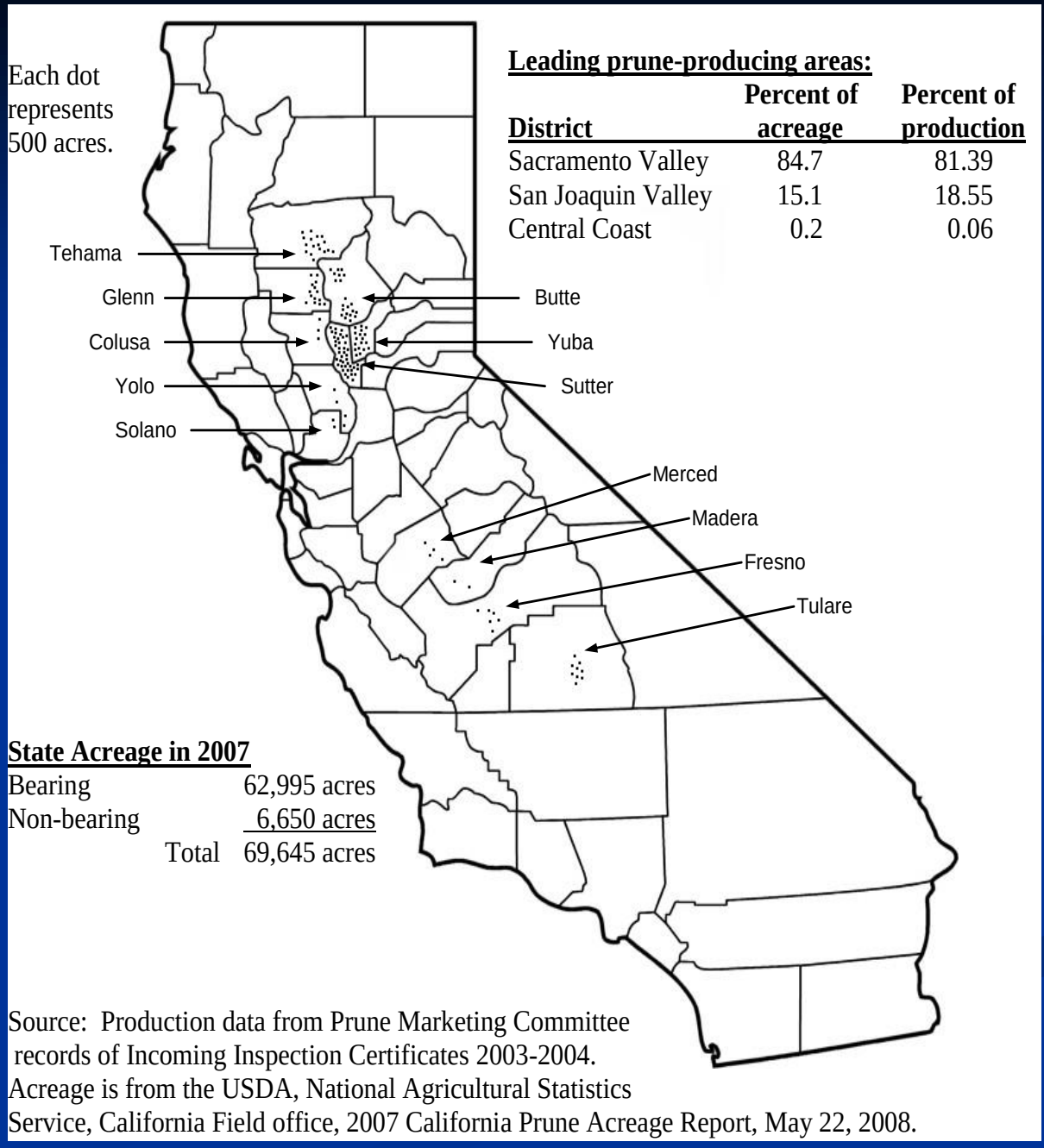
Harvesting prunes

Harvesting prunes

Drying operations

Prune acreage distribution & production, 2007

- Sacramento Valley, nearly 85% of current acreage
- San Joaquin Valley, 15% of acreage
- Central Coast production has virtually disappeared



Leading prune-producing areas:

District	Percent of acreage	Percent of production
Sacramento Valley	84.7	81.39
San Joaquin Valley	15.1	18.55
Central Coast	0.2	0.06

State Acreage in 2007

Bearing	62,995 acres
Non-bearing	6,650 acres
Total	69,645 acres

Source: Production data from Prune Marketing Committee records of Incoming Inspection Certificates 2003-2004. Acreage is from the USDA, National Agricultural Statistics Service, California Field office, 2007 California Prune Acreage Report, May 22, 2008.

Acreage summary of French cultivars compared to all other varieties, 2007

- 98% of acreage consists of French Types

Variety	Bearing Acres	%	Non-Bearing Acres[3]	%	Total Acres	%
French Types[1]	61,708	98.0	5,482	82.4	67,190	96.5
Other Varieties[2]	1,285	2.0	1,168	17.6	2,453	3.5
Total	62,993	90.5	6,650	9.5	69,643	100.0

[1] Includes acreage of French, Improved French, and Gerrans Early French varieties.
[2] Includes acreage of Burton, Friedman, German, Imperial, Italian/Fallenberg, Miro, Moyer, Punian, Ross, Sergeant/Robe De Sergeant, Sierra Sweet, Sugar, Victor Large, 29-C, and 707 varieties.
[3] Non-bearing acres include plantings from 2002 to 2007.
Source: California Agricultural Statistics Service data appearing in 2007 California Prune Acreage Survey, May 22, 2008. National Agricultural Statistics Service, California Field office, Sacramento, California, 3 pps.

Prune acreage distribution & production by county

- California's five leading prune counties are Sutter, Butte, Yuba, Tehama, and Glenn
- Tulare and Fresno counties lead the San Joaquin Valley

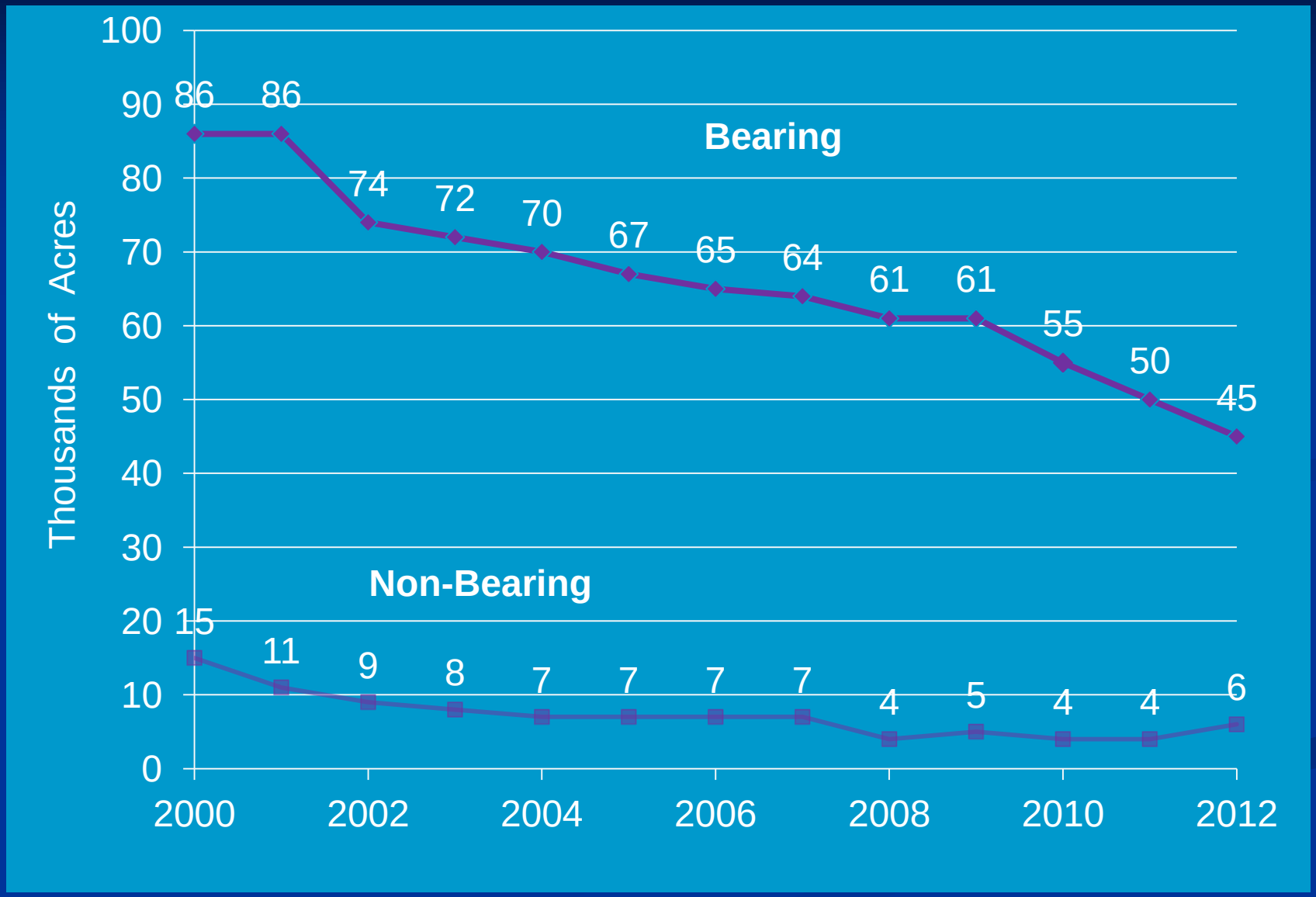
Table 1. Dried Prune Acreage, Production, and Production-Per-Acre in California by County and Region

District	County	2007 Acreage			2003-2004 Net Tons	
		Bearing	Non-Bearing	Total	Total dried prune production	Average production per acre
Santa Clara-Napa-Sonoma	Napa	5	0	5	0	0.0
	Santa Clara	85	0	85	97	0.8
	Santa Cruz	15	0	15	0	0.0
	Sonoma	35	0	35	0	0.0
	TOTAL	140	0	140	97	0.8
Sacramento Valley	Amador	13	0	13	0	0.0
	Butte	8,777	1,165	9,942	25,645	2.7
	Colusa	1,317	39	1,356	4,322	2.1
	Glenn	6,537	311	6,848	14,934	2.1
	Placer	107	0	107	684	2.2
	Shasta	57	0	57	214	4
	Solano	1,139	27	1,166	2,260	1.8
	Sutter	17,427	2,780	20,207	45,903	2.3
	Tehama	7,725	622	8,347	17,866	2.1
	Yolo	1,577	175	1,752	7,314	4.3
	Yuba	8,475	693	9,168	23,446	2.5
	TOTAL	53,151	5,812	58,963	142,588	2.6
San Joaquin Valley	Fresno	3,035	91	3,126	10,861	3.4
	Kern	0	17	17	61	1
	Kings	0	34	34	0	0
	Madera	1,133	0	1,133	4,402	3.1
	Merced	1,716	125	1,841	5,183	2.6
	Stanislaus	25	0	25	126	2.6
	Tulare	3,795	571	4,366	11,882	2.4
	TOTAL	9,704	838	10,542	32,515	2.5
	STATE TOTALS	62,995	6,650	69,645	175,200	2.0

Acreage totals may not add due to rounding. Non-bearing acreage includes plantings for 2002-2007.

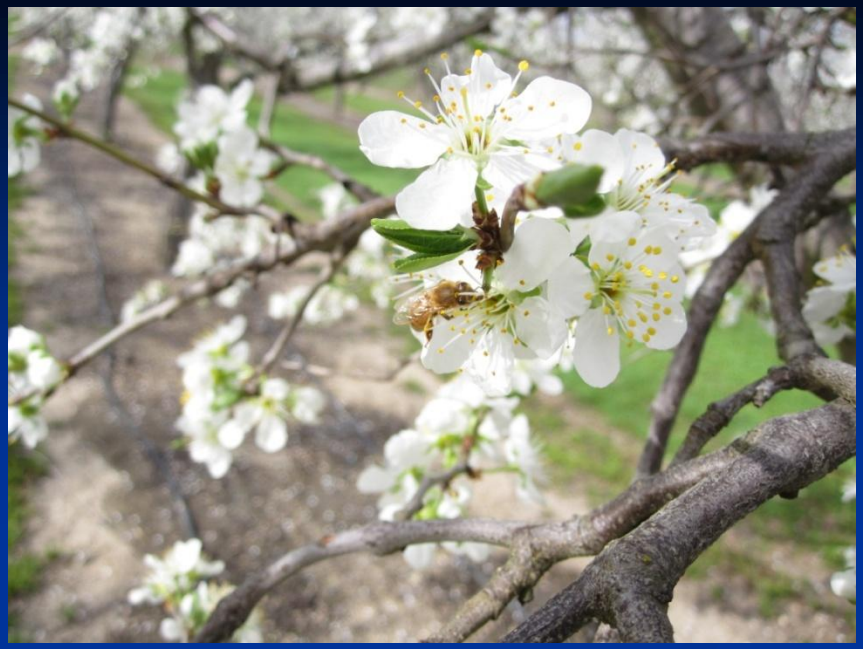
Source: Production data, Prune Marketing Committee records of Incoming Inspection Certificates. Acreage is from the USDA, National Agricultural Statistics Service, California Field office, 2007 California Prune Acreage Report, May 22, 2008.

Recent prune acreage trend



Economics

- Economic sustainability is always *the greatest challenge*
- External costs all continue to rise
- Prune prices to the grower can fluctuate dramatically from year to year



Economics

- Cost Studies are produced by Farm Advisors working with the UC Davis Department of Agricultural and Resource Economics

- Available on-line at http:\\coststudies.ucdavis.edu

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2012

SAMPLE COSTS TO ESTABLISH
A PRUNE ORCHARD AND PRODUCE

PRUNES

(DRIED PLUMS)

SACRAMENTO VALLEY

French Variety & Low-Volume Irrigation

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Thanks for your early morning attention!

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